PB83-234948

Revisions to Continuous Emission Monitoring Systems. Performance Specifications 2 and 3 Summary of Comments and Responses

(U.S.) Environmental Protection Agency
Research Triangle Park, NC

Sep 82

U.S. Department of Commerce
National Technical Information Service
NTIS

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA-450/3-82-022		PB83 234948

4. TITLE AND SUBTITLE	5. REPORT DATE
Revisions to Continuous Emission Monitoring Systems Performance Specifications 2 and 3 - Summary of Comments and Responses	September 1982
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
Emission Measurement Branch	
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT NO.
Emission Standards and Engineering Division Office of Air Quality Planning and Standards U.S. Environmental Protection Agency Research TRiangle Park, NC 27711	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS	13. TYPE OF REPORT AND PERIOD COVERED
Director, Office of Air Quality Planning and Standards Office of Air, Noise, and Radiation U.S. Environmental Protection Agency Research Triangle Park, NC 27711	14. SPONSORING AGENCY CODE EPA/200/04

15. SUPPLEMENTARY NOTES

16. ABSTRACT

This document contains introductory material regarding the proposed revisions (January 26, 1981, 46 FR 8352) to Performance Specifications 2 and 3. The changes made to the proposed revisions are listed along with the comments received and the Administrator's responses to those comments.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
		13 B

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Unlimited	Unclassified	80
	20. SECURITY CLASS (This page)	22. PRICE
	Unclassified	

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

PB83-234948

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EPA-450/3-82-022
September 1982

Air

EPA

Revisions to Continuous Emission Monitoring Systems-Performance Specifications 2 and 3-Summary of Comments and Responses

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

EPA-450/3-82-022

Revisions to Continuous Emission Monitoring Systems Performance Specifications 2 and 3 (Proposed January 26, 1981, 46 FR 8352) Summary of Comments and Responses

Emission Measurement Branch
Emission Standards and Engineering Division

U.S ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

September 1982

This report has been reviewed by the Emission Standards and Engineering Division of the Office of Air Quality Planning and Standards, EPA, and approved for publication. Mention of trade names or commercial products is not intended to constitute endorsement or recommendation for use. Copies of this report are available through the Library Services Office (MD-35), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711; or, for a fee, from the National Technical Information Services, 5285 Port Royal Road, Springfield, Virginia 22161.

TABLE OF CONTENTS

		Page
Chapter 1.	INTRODUCTION	1
Chapter 2.	SUMMARY OF CHANGES SINCE PROPOSAL.	3
Chapter 3.	SUMMARY OF COMMENTS AND RESPONSES.	6
	Table 1. List of Acronyms Used in Summary of Comments and Responses	2
	Table 2. List of Commenters	73

Chapter 1

INTRODUCTION

On January 26, 1981, the U.S. Environmental Protection Agency (EPA) published in the Federal Register (46 FR 8352) revised "Performance Specification 2 - Specifications and Test Procedures for SO_2 and NO_x Continuous Emission Monitoring Systems in Stationary Sources," and "Performance Specification 3 - Specifications and Test Procedures for O_2 and CO_2 Continuous Emission Monitoring Systems in Stationary Sources." These revised specifications were proposed under the authority of Sections 111, 114, and 301(a) of the Clean Air Act, as amended.

Public comments were solicited at the time of proposal. To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed specifications, a public hearing was scheduled for February 19, 1981, beginning at 9:00 a.m. The hearing, however, was not held because no one requested to speak. The public comment period was from January 26, 1981, to March 27, 1981.

Twelve comment letters on the proposed revisions to the performance specifications (PS's) were received from industry, Federal agencies, State air pollution control agencies, trade associations, and State air pollution control agencies, trade associations, and equipment manufacturers. The comments that were submitted, along with EPA's responses, are summarized in this document. The summary of comments and responses serves as a basis for the revisions that have been made to the test methods between proposal and promulgation.

TABLE 1. LIST OF ACRONYMS USED

CD - Calibration Drift

CEMS- Continuous Emission Monitoring System

NSPS- New Source Performance Standards

PS - Performance Specification

PST - Performance Specification Test

QA - Quality Assurance

RA - Relative Accuracy

RM - Reference Method

SIP - State Implementation Plan

CHAPTER 2

SUMMARY OF CHANGES SINCE PROPOSAL

1. Section 60.13(c)(2)(ii). The revision proposed for this subparagraph is no longer under consideration.

2. Section 60.13(d). The limit of the mandatory adjustment of the zero and span drifts was changed from the applicable specification to twice the applicable specification. The requirement to quantify and record the amount of excess zero and span drift was changed to require the quantifying and recording only when specified.

3. Section 1.1. (Note: All sections refer to PS 2, unless otherwise specified.) A second paragraph was added to explain that performance specification (PS) is not designed to evaluate the installed continuous emission monitoring system (CEMS) over an extended period of time nor does it identify specific calibration techniques and other auxiliary procedures to assess the CEMS performance. This paragraph also reminds the source owner or operator of his/her responsibility to properly calibrate, maintain, and operate the CEMS. This paragraph was also added to PS 3.

4. Section 3. Parts of Section 3.1, 3.1.1, and 3.2 have been amended to address locations at inlets to control devices.

5. Section 3.1. The last sentence in the first paragraph was revised to read, "If the cause of failure to meet the RA test is determined to be the measurement location and a satisfactory correction technique cannot be established, the Administrator may require the CEMS to be relocated." The RA stands for relative accuracy.

6. Section 3.2. For stacks greater than 2.4 meters, the use of the 0.4, 1.2, and 2.0 meter points was limited to those cases where pollutant stratification is not expected and prohibited after wet scrubbers or at points where two streams with different pollutant concentrations are combined.

For those cases where the pollutant concentration changes are due solely to diluent leakages (e.g., air heater leakages) and pollutants and diluents are simultaneously measured at the same location, the option of using a half-diameter in lieu of two equivalent diameters is allowed.

7. Section 4.1. The limits of the recorder high level was changed from 90 to 100 percent of the span value to a value between 1.5 times the pollutant concentration corresponding to the emission standard level and the span value. The option of using a value between 50 and 100 percent of the high-level value was allowed provided the data recorder full-scale requirements are met. The zero and high-level points for the determination of calibration drifts were changed from "0 to 50" to "0 to 20" and from "80 to 100" to "50 to 100" of the high-level value.

Inlets to scrubbers were also addressed.

8. For SO_2 emission standards between 130 and 86 ng/J (0.30 and 0.20 lb/million Btu), the RA specification was changed to 15 percent; and below 86 ng/J (0.2 lb/million Btu), the RA specification was changed to 20 percent of the emission standard.

9. Sections 5.2 and 5.3. The minimum acceptable operational condition was changed from 50 percent "capacity" to 50 percent "of normal load."

10. Section 5.3. This section was changed to allow the RA test to be conducted during the calibration drift (CD) test period.

11. Section 6. The third paragraph concerning the use of incremental addition procedure was deleted. The first paragraph was revised to allow other CD procedures as long as the CD can be determined.

12. Section 7.1.2. The sentence, "A test run for grab samples must be made up of at least three separate measurements," was added.

13. Section 7.2.2. For those cases where the pollutant concentration is varying with time over the run, the arithmetic average of the CEMS value recorded at the time of each grab sample is being allowed.

14. Section 7.3. The second sentence was deleted, and a revised sentence was placed under Section 7.1.2.

CHAPTER 3

SUMMARY OF PUBLIC COMMENTS AND RESPONSES

Commenter VI-D-1

1.1 Comment: Section 4.1. (Note: All sections refer to PS 2, unless otherwise noted.) Setting the span at the expected range of operation would be more appropriate.

Response: The span level must be chosen so that the majority of the measurements will be accomplished at about midscale and still allow the calculation of a monthly emission average or control device percent reduction average. To obtain the latter, it is best to select a high span level; however, the CEMS would become less accurate at the low levels. If the span level is too low, then data would be lost when the emissions exceed the recorder full scale. To allow some compromises, Section 4.1 has been revised to allow spans to be set at 50 to 100 percent of recorder full scale as long as a high-level value is read between 90 and 100 percent of the data-recorder full scale. The high-level value is selected between 1.5 times the emission standard level and the span (which is generally 1.5 to 2.5 times the expected emissions).

1.2 Comment: Section 3.2. In large diameter stacks there would be no significant difference in results obtained from three sample points compared to a single-point sample. A more representative sample could be drawn from a single point, or points nearer the centroid of the stack.

Response: The use of three test points was based on "Magnitude of SO_2, NO, CO_2 and O_2 Stratification in Power Plant Ducts"

(EPA-600/2-75-053, September 1975) and "Sampling Location for Gaseous Pollutant Monitoring in Coal-Fired Power Plants" [Source Evaluation Society Newsletter 4(2), May 1979]. A single point located 1 meter or more from the stack wall could be -11 percent off from the average emission rate, and a single point at the centroid could be +9 percent off. The use of three points allows measurements to within ±3 percent of the average.

1.3 Comment: The proposed revisions to Appendix B are in the best interest of all involved in continuous monitoring. I am certain the revisions will result in a marked improvement of monitoring programs.

Response: None required.

Commenter VI-D-2

2.1 Comment: The proposed revisions will have profound effects on State implementation plans (SIP) across the country and, in particular, on SIP that include provisions for use of CEMS data for demonstration of compliance with emission regulations. Yet it is difficult to fully evaluate the impact of the revisions since EPA has given no opportunity to review either the CEMS guidelines or Appendix E. We feel very strongly that no revisions should be made until those documents are proposed and reviewed.

Although, for the most part, it appears that the proposed revisions might be appropriate for CEMS's installed to indicate proper operation and maintenance of pollution control equipment, EPA must realize that SIP

refer to the Federal regulations when specifying requirements for compliance monitoring. With no mandatory design or installation specifications and precious few mandatory performance specifications, review of proposals to install a CEMS for compliance monitoring could not be effective. It is doubtful that expenditures of the magnitude involved in installing a CEMS could be justified without prior indication of the ability of the CEMS to provide accurate data. Sources and control agencies would be at the mercy of manufacturers' claims. Sources could be tempted to purchase inexpensive, poorly engineered systems, which would have a very low probability of passing the certification tests. If the system is installed and fails certification, it is likely that the source would claim economic hardship rather than replace or relocate the system. Thus, if the design, installation and most of the performance specifications are to published as guidelines only, EPA should undertake a program to certify equivalent systems (analysis and sample interface) as is done for ambient monitors. If EPA is unwilling to provide this assurance of probable ability of systems to provide accurate data, all specifications should remain mandatory for CEMS's used for compliance monitoring.

Response: The primary objectives of the CEMS PS's are evaluation of data accuracy and representativeness. To accomplish these objectives, EPA feels that the three specifications, which include the limits of inaccuracy and drift, listed under Section 4 of PS 2 and Section 2 of

PS 3 are the essential requirements; i.e., the CEMS must be accurate, must not drift, and must provide a means for determining drift.

The proposed PS's are not designed to evaluate the installed CEMS performance over an extended period of time nor are they designed to evaluate adequacy of quality assurance (QA) procedures. For that matter, neither are the present PS's. The performance specification test (PST) procedure determines the acceptability of the RA along with the monitoring location and the acceptability of the drift for 7 consecutive days. At this time, the only means for evaluating CEMS's for extended periods of time is a provision in Section 60.13(c), which allows the Administrator under Section 114 to require the owner or operator of the affected facility to conduct additional CEMS performance evaluations.

At the present time, QA procedures are being formulated to determine whether a CEMS produces acceptable data (i.e., with the desired RA) on a day-to-day basis so that the data can be used for continual compliance purposes. As was mentioned in the preamble, EPA plans to publish such procedures at a later date to determine precision and accuracy.

The CEMS guidelines were available in draft form in a separate document and have been available upon request since the time of proposal of the PS's for review. As was mentioned in the preamble, the CEMS guidelines are to assist vendors, purchasers, and operators of CEMS's with supplementary equipment and performance specifications, and are essentially the specifications proposed on October 10, 1979. The CEMS guidelines are not mandatory and are intended to aid in the selection of a CEMS.

The EPA agrees that it is doubtful that the owner or operator of an affected facility would install a CEMS without prior indication of the ability of the CEMS to provide accurate data. Most sources ask for references to determine the monitor's past performance and require some form of guarantee that the CEMS would pass the PST. The Agency feels that this is a better approach than instituting a costly certification program or mandating the present PS's.

2.2 Comment: Section 60.13(d). The wording requiring quantification of excess drift is unnecessary since Section 60.7(d) requires maintenance of the calibration data in the 2-year file. If the intent was to require reporting of excess drift, that has not been accomplished.

Response: Although Section 60.7(d) requires maintenance of the calibration data in the 2-year file, these data may not provide the means to quantify excess drift. For example, not all CEMS's have strip charts. Some use computer printouts and may give only the adjusted output. The intent was not to require reporting of excess drift on a regular basis, but that the data should be available upon request.

2.3 Comment: Appendix B. The only performance specifications that could be eliminated without jeopardizing the evaluation of a CEMS are the 2-hour zero and span drifts. These specifications do not

relate to normal, daily system operation. All other design, installation, and performance specifications should be retained as mandatory requirements.

Response: We agree that the 2-hour zero and span drifts are not usually checked during the normal, daily system operation. We also feel that response time and calibration error fall in this same category and these instrument checks should not be made mandatory. The CD test is also a form of calibration error determination and would be redundant if the calibration error test is retained.

2.4 Comment: One general requirement which we feel should be added for a CEMS used to determine compliance with emission regulations is a periodic three-point calibration check. The present requirement for a daily two-point (zero and 80-100 percent of full scale) check would not necessarily identify problems with the calibration system (gas or cell) or the linearity of analyzer response. The monitor could be adjusted to read the expected upscale value regardless of whether the system was, in fact, operating properly. Addition of the extra upscale point would provide a check of both the linearity of analyzer response and the integrity of the calibration gas or cell.

Response: The use of a periodic three-point calibration check is to evaluate the CEMS on a long-term basis. Such checks properly belong in the QA procedures.

2.5 Comment: (a) We agree that the sample acquisition point for RA RM testing need not be adjacent to the monitor sample acquisition point. In fact, the RM point should be located so as to be acceptable for new source performance standards (NSPS) compliance testing.

Comment: (b) We agree with the relaxation of the RA specification when actual source emissions at normal process operating capacity are less than 50 percent of the standard. However, we would caution against extending this concept to the point where monitoring results would be used only as a pass/fail indication with respect to emission regulations. The purpose of these requirements should not be confused with alternative types of performance regulations, such as sulfur in fuel, which try to achieve a general nonquantitative level of emissions.

Response: None required.

Commenter VI-D-3

3.1 Comment: Section 7.2.2. When NO_x concentrations are not linear with time, the RM average cannot be expected to agree with the integrated CEMS record over the set of three grab samples. It is our suggestion that the three grab samples be taken simultaneously (within a 3-minute period) if possible. If for some reason it is desirable to spread out the grab samples beyond the 3-minute period

(up to 21 minutes), we suggest that the average RM values be compared to the average CEMS values recorded at the time of each grab sample.

Response: Section 7.2.2 has been revised to allow the use of the arithmetic average of the CEMS values recorded at the time of each grab sample.

3.2 Comment: Section 7.3. This section appears inconsistent with Section 7.1.2, which requires a 21-minute maximum for each set of grab samples.

Response: This section has been revised to make it consistent with Section 7.1.2. The second sentence should have been placed under Section 7.1.2 with the word "set" changed to "run." The intent was that three Method 7 grab samples constitute a test "run." The word "set" refers to all necessary RM tests; e.g., Method 7 and Method 3 would constitute a set.

Commenter VI-D-4

4.1 Comment: A review of these specifications shows them to be significantly improved over the existing specifications. The following changes have been made:

a. Calibration Error and Zero Drift requirements have been combined with the CD specifications. This would reduce the amount of effort required for completing the test.

b. The CEMS Response Time requirement has been eliminated.

c. Reference Method Measurement Location and Traverse Points are clearly specified.

d. The 1-week conditioning period prior to starting the PS test has been eliminated.

Response: None required.

4.2 Comment: Section 4.1. One should be allowed to use a span gas concentration of 50 to 100 percent span. This would provide more flexibility to the operator without any significant loss in accuracy.

Response: See Response 1.1.

4.3 Comment: Section 5.3. There is a typing error. The second sentence should read: "To meet the specifications, the RA must be equal to or less than 20 percent of the mean value of the RM test data in terms of the units of the emission standard or 10 percent of the applicable standard, whichever is greater."

Response: This section has been corrected.

4.4 Comment: Section 6. It is not clear if the reference gases during these tests would be introduced into the analyzer or through the entire CEMS. Since gas cells or optical filters are allowed, it would

indicate that the intent here is to consider the drift of the analyzer alone.

Response: The intent is to determine the CD according to the written procedure of the source owner or operator. The acceptability of the procedure will be determined under the QA procedure.

Commenter VI-D-5

5.1 Comment: These regulations will apply to all sources subject to PS 2 and 3, including some sources subject to Appendix P of 40 CFR Part 51. We are concerned that these proposed revisions may result in additional expenditures to the systems installed at our facilities, without resulting in any improvement in the accuracy, reliability or enforcement capability of those instruments. We have now completed installing and modifying our opacity, nitric oxide, and diluent monitors, an effort which began in 1976, and has cost approximately $9 million. It is our estimate that these revised specifications could require the expenditure of an additional $300,000 for testing, and increase maintenance costs from about $20,000/year/monitor to $30,000/year/monitor. Other users could face more severe relocation or replacement costs. In other words, we strongly disagree with EPA's statement that

> ". . . existing CEMS that met the specifications of the current PS 2 and 3 also meet the requirements of these revised specifications, and therefore, do not require retesting."

We believe that these specifications could require replacement or testing, depending on responsible agency's interpretation, of many of the emission monitors installed since October of 1975. We, therefore, still urge EPA to exclude existing monitoring installations from the proposed revisions with the following language:

> "Existing monitoring installations shall be excluded from these revisions unless the responsible agency demonstrates by testing the inadequacy of the installation location, opacity calibration, or RA."

As we urged in our December 7, 1979, submittal application of these changes to existing systems should be excluded. While the intent is reasonable, it could be misinterpreted by many local agencies. Specifically, RM location requirements, system accuracy requirements and other key areas have changed. It is clear that a system which meets the existing PS might be properly located but still require retesting due to RM requirement changes. It might also fail a ±20 percent system error.

Response: The intent of the cited statement was to let agencies know that they should not require retesting of all existing monitors under the revised PS's. Existing CEMS's cannot be exempted from being retested because it would be contrary to 60.13(c); however, the PS's have been amended to prevent CEMS's from being relocated to the case where a satisfactory correction technique cannot be established.

5.2 Comment: We appreciate your consideration of our December 7, 1979, comments on this subject and note that many significant improvements have been made. We still have two major concerns with this recently revised proposal:

a. Section 3.2. The RM measurement location requirements should exclude the "two equivalent diameter requirement" when: (1) pollutant concentration changes are due solely to diluent leakage, and (2) diluents and pollutants are simultaneously measured at the same location. This allows practical siting of RM locations in large ducts, and will not affect the accuracy of the method.

b. Section 4.2. In over 300 RA tests conducted throughout our system of 29 CEMS's, we have often found calibration errors in excess of ±2.5 percent of span, but RA results have been well within ±20 percent of the RM. While we use 2.5 percent for testing, it is overly restrictive for normal operation. In fact, it is often counterproductive, requiring much more adjustment and maintenance time with no resulting improvement in RA, but with significantly reduced reliability.

In order to provide a practical and workable rule, you should change this requirement to ±5 percent before readjustment is required in normal operation, or change paragraph 60.13(d) to refer to 24-hour zero and span drifts of twice the amount referenced in this paragraph.

Response: Section 3.2 and Paragraph 60.13(d) have been revised to incorporate the suggestions.

5.3 Comment: The EPA states that these PS's, although related to QA, should be evaluated on the basis of their adequacy in evaluating the CEMS's after their initial installation. One initial test is completely inadequate to demonstrate any suitability beyond the test period. Our experience indicates most problems occur after this initial test, even with good maintenance. Hence, the proposed PST cannot adequately evaluate a CEMS without a continuing long-term (6 months or more) test. If EPA wishes to identify such long-term testing as QA, then it should be integral to the PST for most currently available monitors.

In any case, we again suggest that the best course of action for EPA is to continue to review these PS's while developing a QA program and gathering statistically significant data on a wide range of analyzers. Then, revised PS's and a workable QA package could be promulgated simultaneously. Such a course of action would preclude equipment modifications and retesting at this time which may prove to be unnecessary or counterproductive.

Response: We agree that one initial test is completely inadequate to demonstrate any suitability beyond the test period. The initial PST is to demonstrate the CEMS adequacy at the time of the initial installation or soon thereafter. The QA procedure is to evaluate CEMS's on a long-term basis; therefore, we do not feel that the QA procedure should be an integral part of the PST. However, users have the option of requiring an evaluation over a longer period of time.

The EPA will continue to review the PS's while developing a QA procedure; however, the determination of acceptable QA programs will be left to the user.

5.4 Comment: Section 2.1.4. Change title to "Data Aquisition System." The recorder is usually only a small part of a cost effective data system.

Response: The definition includes data aquisition; therefore, a change need not be made.

5.5 Comment: Section 3.1. The first sentence allows correction of CEMS data ". . . so as to be representative of the total emissions of the affected facility." We agree with this statement. However, Section 3.1 also states, "If the cause of failure to meet the RA test is determined to be the measurement location, the CEMS may be required to be relocated." We believe that this sentence should be deleted and that data correction should be allowed in all cases where RA results can be applied to generate a correction factor. This correction factor would then be checked and modified during periodic QA testing at the facility.

Response: The cited statement was intended to take care of those cases where a practical solution for correcting the data cannot be reached. The statement has been revised to read, "If the cause of

failure to meet the RA test is determined to be the measurement location and a satisfactory correction technique cannot be established, the Administrator may require the CEMS to be relocated."

5.6 Comment: Section 3.2. We recommend inserting "at least" in front of "three traverse points" in the minimum requirements. In large ducts, 6, 9, or more may be needed. Allowance of added points as needed should be explicitly stated.

Response: More than three points are allowed. Note the phrase, "minimum requirements."

5.7 Comment: Section 3.2. The point location should also be revised. Since "measurement line" is not defined, we assume it extends from stack wall to stack wall. For stacks with large diameters (e.g., 5 meters), there is no guarantee that the samples will be representative of facility emissions. We recommend deleting this sentence and retaining the 16.7, 50, and 83.3 percent of measurement line unless another configuration can be shown to be representative.

Response: The measurement line is defined earlier in the paragraph. Note that the second criterion is an option, not a mandatory requirement. It is true that for large (also for small) stacks, there is no guarantee that the samples taken with the second criterion will be representative of the emissions and that the first criterion of 16.7, 50.0, and 83.3 points offers a better chance, if there is stratification. The second criterion was based on practicality for those cases where

stratification is not expected. The text has been revised to make this clear.

5.8 Comment: Section 4.1. This paragraph is confusing as written. We assume that it suggests setting both data system equipment and the CEMS analyzer spans with a 90-100 percent of full-scale value. While this is normal for highly linear data system equipment, it may be ill-advised for the analyzers. In that case, the span level should be permitted at other than 90-100 percent without requiring Administrator approval. A span level near the regulation limit (about 50 percent of full-scale) is suggested. Some light absorption [e.g., nondispersive infrared analysis (NDIR)] detectors have nonlinear outputs that are not as effective near full scale as the response curve flattens out.

Response: See Response 1.1.

5.9 Comment: Section 4.2. While it appears that a source may adjust its CEMS as needed during the performance testing to meet the ±2.5 percent criteria (Re: Paragraph 6) this is not immediately clear. We suggest adding the phrase "allow daily (more often if specified) adjustment, if necessary."

Response: The CEMS is not to be adjusted unless it is part of the normal operating procedure. Section 6 has been revised to reflect this.

5.10 Comment: Section 4.3. By including potential stratification effects within the RM test as well as pollutant and diluent errors within the ±20 percent you have effectively made a ±30-50 percent requirement much more severe. While we successfully use such a standard on our sources, it is not clear that this is economically reasonable or technologically feasible. In any case, we suggest that this be demonstrated - on a variety of sources - before forcing utilities into an overly expensive and time consuming program which may never work as intended.

Response: Many CEMS have met the ±20 percent criterion for combined pollutant-diluent systems. If a CEMS is not capable of meeting this requirement during the initial PST, it would certainly be a poor candidate for a long-term reliable operation. See also Response 8.3.

5.11 Comment: Section 5.2. Load or capacity should be allowed to vary over the full range that it does in normal operation, including nearly full loads, but not limited to 50 percent. If loads of less than 50 percent are typical of unit operation, it is important to test at 50 percent load. Large errors may often be introduced by negative duct pressures, different temperatures, etc., at low loads. Further, the 50 percent restriction places an unreasonable burden on existing units.

Response: This section has been revised to 50 percent of normal operation.

5.12 Comment: Section 5.3. It is not essential to hold the RA test period until after completion of the CD test. This should be up to the source, based on experience with the monitors under test and scheduling needs.

Response: The section has been revised to allow RA testing during the CD test period.

5.13 Comment: Section 6.0. The incremental addition procedure should not be tied to 80-95 percent of span, but rather to an appropriate incremental cell which will provide the most meaningful demonstration of the analyzer's operation. The value will depend on stack concentrations and the shape of the Beer's law curve for the given analyzer.

Response: The third paragraph has been deleted. Since this case is mentioned in Section 4.1, it is not necessary to make mention of it again.

5.14 Comment: Section 7.1. In our 3 years of RM testing, we have found that it is relatively simple to pass existing PST's at one load or boiler condition - but that in our boilers, where loads and

fuels vary widely, the RM tests need to be done over the full range of operating conditions. We suggest that the tests be made over a representative set of conditions and a long period of time, e.g., several months.

Response: This is one option that we have decided not to mandate because of cost considerations. To write the PS's so as to cover all source conditions would require the most stringent approach, which can be costly and may be unnecessary for some or the majority of the sources. However, the sources, understanding their peculiar problems, may choose to use the more stringent procedures to ensure the specified RA requirement.

5.15 Comment: Section 7.1. If the source operating conditions vary significantly with time, the calculated emission rate may have no relationship to the actual emission rate unless pollutant and diluent measurements are taken simultaneously. We recommend requiring simultaneous measurements unless the source operator can show that time/pollutant variations are insignificant.

Response: See Response 3.1.

Commenter VI-D-6

6.1 Comment: The proposed rules are certainly consistent in that the only method of determining the acceptability of a given instrument

is with respect to the RM's. Unfortunately, during the last 5 years we have not seen any advancement in the accuracy, repeatability, reliability or cost associated with the RM's. In the same period, we have seen substantial improvements in our gas measuring instruments to the point where, in many cases, they are a much better criteria for establishing emissions than are the RM's.

At the current time and under the proposed specifications, there is no criteria which either qualify or motivate the stack sampler to do an adequate job. We recognize that there have been interlab comparison studies which have attempted to evaluate RM accuracy, but how valid is the data so obtained when the intent is known, as opposed to running a stack sampling exercise in the field with sometimes poorly trained personnel and under trying, demanding and adverse conditions? Since EPA has established the RM's, it seems that they have been very wary of quantifying inherent errors or attempting to provide quality checks to ensure that inadequate RM data are not used in any of the required test evaluations. In particular, RM 7 has been nearly universally proclaimed by stack samplers and users alike as a very imprecise method. Further, the American Society for Testing and Materials (ASTM) describes several biases and interferences for this method which are never mentioned in the EPA descriptions. At the current time, we believe that RM 7 may exhibit a substantial negative interference due to chlorides which are present in the outlet of wet scrubber type flue gas

desulfurization systems. Reference Method 6 is certainly better than Method 7, but still is not ideal and their consistency is, in no way, comparable to National Bureau of Standards (NBS) reference materials.

At a minimum, under the above conditions, the RM should be verified using a traceable NBS gas, and only that RM which meets the blind gas sample check should be acceptable for verifying an instrument. All manual stack sampling reference data should be qualified during each test using blind gas samples. If the errors are believed to be consistent during a given run, the RM data should be corrected according to the error observed in the blind sample. Further acceptance criteria should be established in terms of the uniformity of individual data points established in a given run.

Response: The commenter's primary contention is that NBS reference gases are better checks for accuracy than the RM's on the basis that RM's are "fickle." It is true that the RM's can give erroneous results when the procedure is not properly executed. This is also true of a CEMS. The Agency is presently in the process of including QA procedures into Methods 2 through 8 to ensure high probability of obtaining valid data.

The Agency considered for Methods 6 and 7 a periodical check against a known gas cylinder concentration. At this time, however, we feel that qualifying testers at each test in the use

of the RM's against blind gas samples would be costly. We feel that the option to use such a procedure should be left to the vendor and the user.

We see no reason why the RM should be verified time-after-time against traceable NBS gases. The methods have been established as RM's and have been proven to provide accurate data, when properly executed. It would seem prudent to inquire into the tester's experience and secure testers with an established reputation of providing accurate and precise results to run a stack sampling exercise in the field under trying, demanding, and adverse conditions. If the RM's are properly conducted and the quality control procedures in the methods are carefully followed, the results will be accurate measures of emissions.

We agree that Method 7 is less precise than Method 6. The imprecision of these methods has been considered when the $\pm$20 percent criterion was established.

Method 7 does not mention the chloride interference mentioned in the ASTM method since high concentrations of chlorides were not expected in nitric acid and power plants. About a 1:1 ratio of chloride to NO_x is required before there is any appreciable reduction in concentration.

6.2 Comment: Because of the ability to calibrate these instruments dynamically, i.e., at stack temperature and pressure, using either direct or traceable NBS reference gases, instruments can be made accurate, and measurements very repeatable. Using the criteria you have proposed, one would be forced to throw away the only consistent and accurate standard which we have and attempt to design instruments to meet a fickle RM -- this is

certainly not in the best interests of regulator, vendor, or user. The reason I say that you have essentially outlawed traceable gases in your proposal is that in the event that an instrument fails the RA (RM correlation) test, the users' most promising approach is to reset the calibration so that it is supposedly equal to the past RM data and run the test again. This does not achieve the desired results of consistent, accurate calibration.

For those instruments whose calibration can be validly checked using direct or traceable NBS gases, the testing with respect to existing RM's is a redundant and an unnecessary, costly exercise. It may be reasonable to use RM's sometimes to evaluate the potential stratification effects on the CEMS, but the NBS gases should be an acceptable measurement qualifying media. Certainly not all instruments can be validly checked with NBS gases under dynamic stack conditions, but those which can, should be permitted to be operated with certification criteria which are relevant to the capabilities of such instruments. We strongly recommend that the EPA should investigate the capabilities of such instrumentation and determine if the desired accuracy and consistency can be obtained with less costly testing procedures.

Response: We would tend to agree that the capability to dynamically calibrate instruments is a plus in instrument design. However, calibration gases are not identical in composition as the stack effluent being monitored. In addition, in several

cases, when differences were found between the CEMS and the RM's, the cause was traced to an incorrect moisture correction, moisture interference, or a plugged filter, i.e., dynamic calibration, by itself, is not sufficient to ensure accurate results.

The use of direct or NBS reference gases is not prohibited. The PS merely allows greater flexibility of meeting the RA requirement. For example, there are users of instruments who obtain accurate results by using gas cylinders that are analyzed by the RM's. The use of such cylinders is less costly than NBS reference gases.

Presetting the calibration is not improper if improper calibration is determined to be the cause for the difference between the CEMS and the RM's; however, resetting the calibration based on erroneous RM results would not be prudent.

We agree that for those instruments whose calibration can be validly checked using direct or traceable NBS gases in lieu of the RM's would be a redundant, unnecessary, and costly exercise. However, how does one determine what "constitutes" a "valid" check? As mentioned earlier, several cases showed that the use of NBS calibration gases by itself is insufficient to check the accuracy of a CEMS. All CEMS operators should establish and demonstrate that their procedure is adequate to "validly" check the CEMS. After the demonstration, one can apply for an alternative procedure under Section 60.13(i) of 40 CFR Part 60.

6.3 Comment: In several places in your proposed values, you have reiterated the RA criteria in terms of ±20 percent of the mean reference value or ±10 percent of the applicable standard, whichever is greater. This specification is to include the pollutant and diluent monitor, as well as the ppm to lb/MBtu converter and recorder. We certainly agree that we should continue to push for more accuracy as long as it is not unduly costly, but this specification is overly demanding, considering that the RM's are far from absolute and that there certainly is less intrinsic value associated well under basic requirements.

If the proposed criteria are promulgated, it will certainly encourage any informed operator to operate as near the emission limit as possible during RA testing to ensure an error window of 20 percent. At emission levels of one-half the emission standard, the ±10 percent of standard becomes effective and remains the effective criteria as emission levels approach zero. This penalizes the conscientious operator and substantially increases the cost of certification.

Response: The relative error criterion of ±20 percent of the mean RM value is not a proposed revision, but is the promulgated requirement. The ±10 percent of the applicable standard is the proposed revision. This criterion was included to alleviate--not penalize--the "conscientious operator." Let us assume that the standard is 500 ppm

and the source is operating at an emission level of 100 ppm. If the ±20 percent criterion is used, the CEMS must operate within ±20 ppm. However, with the ±10 percent of standard criterion, the CEMS must operate within ±50 ppm or ±50 percent of the RM mean value.

6.4 Comment: It is important to note that an increasing number of scrubber applications provide emission levels of 15-50 ppm SO_2 to meet the 70 or 90 percent removal criteria. Considering the fact that, typically, these instruments are scaled for span values of 300 to 750, these readings are a very small percentage of full scale (2 percent to 16 percent), the error allowance in terms of ppm, not percent of reading, is very important. As a result, I would propose that the two-tiered accuracy criteria be eliminated. We would suggest that for a scrubber inlet monitor, the recommended ±20 percent of the emission limit be applied to the actual inlet concentration or RM value. For an outlet monitor, the recommended ±20 percent of the emission limit be applied to the product of the inlet concentration multiplied by the required removal efficiency.

I firmly believe that your proposed criteria, as compared to the one recommended above, are overly demanding and will only cost the user more in terms of repeat testing and will not provide any improvement in overall instrument accuracy. We favor treatment of the system as a whole, but allowances must be sufficient to provide adequate margins for the RM's, each instrument (diluent and pollutant), and associated hardware. Your proposed ±10 percent of the emission standard

does not leave sufficient margins under any, except the most ideal, conditions.

Response: We agree that high span values would cause higher relative inaccuracies at the low concentrations. However, the use of a standard ±20 percent of the emission standard would penalize instruments used on the scrubber inlet, especially if the emission standard is low in comparison to the inlet concentration. In addition, instead of encouraging any improvement in overall instrument accuracy, the suggested criterion, which increases the allowable inaccuracy, would seem to encourage greater inaccuracy. To improve the instrument accuracy at low levels, it would be better to simply allow lower span gases to be used. To avoid retesting, the CEMS should be reliable and without any biases; and competent testers should be used.

For the second recommendation, the correct emission limit should be the product of the inlet concentration multiplied by the allowed removal inefficiency--not required removal efficiency.

6.5 Comment: Another factor needs to be clarified in this general RA area. A scrubber operator may be required to meet a 70 or 90 percent SO_2 removal efficiency as well as a gross 0.6 to 1.2 lb/MBtu ceiling. In terms of your proposed ±10 percent of the emission standard or our recommended ±20 percent of the emission standard, specifically what is the emission standard for an inlet and outlet SO_2 scrubber monitor?

Response: The criterion is ±20 percent of the RM mean value or ±10 percent of the emission standard, whichever is greater. Therefore, at the inlet of the scrubber, the ±10 percent of the emission standard criterion would not be expected to be used, but the ±20 percent of the RM mean value would be used. For the outlet, the emission standards are defined by the regulations. See Subpart Da, Section 60.42a. For example, for sources under 60.43a(a), the emission standard is 1.20 lb/million Btu, or 10 percent of the potential combustion concentration, or 0.60 lb/million Btu, or 30 percent of the potential combustion concentration.

6.6 Comment: In terms of determining scrubber efficiency, it is extremely important that the inlet and outlet monitors be referenced to a common stable reference. Again, the only consistent standard of which we are aware is an NBS gas. Without a common reference, the inlet and outlet monitors could be miscalibrated by up to ±20 percent of reading, which could result in up to a 15 percent error in scrubber efficiency, indicating 55 percent removal when the actual removal is 70 percent.

Response: We agree that the inlet and outlet monitors should be referenced to a common stable reference. Of course, we feel that at present the RM is that reference. In calculating the maximum error that could result from miscalibration, the commenter erroneously assumed that the monitor can be miscalibrated by ±20 percent. Such

a monitor would not pass the RA test, unless the RM gave very precise numbers, an unlikely event. A more reasonable maximum bias is about ±10 percent. Instead of seeing a possible maximum error of ±15 percent at the 70 percent level, one would see about ±7 percent at the 70 percent reduction level and ±2 percent at the 90 percent reduction level.

6.7 Comment: In paragraph 60.13, you have required operators of CEMS to check the zero and span drift at least once daily -- and to readjust the zero and span whenever the 24-hour zero and span drift exceeds the limits of the applicable performance specifications. Since there are no criteria for what constitutes a check of zero and span and since operators do not wish to readjust anything any more often than absolutely necessary, the aggressive instrument manufacturer or user would design this check to include as little of the overall measurement system as possible. In fact, by using a relay to switch the drive signal input to the final current driver, one could ensure that the zero and span checks would be stable and that the instrument would virtually never need readjustment, at least as so far as "zero/span" drift values are concerned. Obviously, this situation is not consistent with the basic intent of the specification and must be corrected. We would suggest that the following statement be added in 60.13(d): "The zero and span drift check must, at a minimum, include all the active components used or referenced in the normal stack gas measurement cycle, except that predictable effects, such as stack temperature compensation,

which would otherwise cause the zero and span values to vary, can be checked independently. The zero and span drift check values shall normally remain invariant from day-to-day if the instrument does not exhibit any drift." This statement would ensure that zero and span drift values provide a valid indication of the stability of the measurement system.

Response: The basic approach of the PS's is to state what is expected of the CEMS and the manner in which the specifications are to be evaluated. This was done to allow greater flexibility in the design and selection of the instruments and to allow for innovative technology.

The first criterion, the RA, is checked with the applicable RM's. The second criterion, the calibration drift at the zero and span levels, is left up to the manufacturers and the users. If the manufacturer designs an instrument to include, as you indicate, as little of the overall measurement system as possible and if the user accepts his design, the user is responsible for the quality of the data. The Administrator, under Section 60.13(c), can require the owner or operator of the affected facility to conduct additional CEMS evaluations. For those sources that must continually comply with the emission standards, the QA procedure will most likely involve periodical RA checks. These RA checks will ascertain the adequacy of the drift check procedures. If the manufacturer does not properly design his instrument to operate reliably and the user accepts such instruments, the user in the long run can be subjected to costly repairs and tests.

We agree that instruments should be designed so that the zero and span calibration checks include all the active components; however, we cannot say that this requirement is absolutely necessary for all designs. The guideline will be revised to include these points.

6.8 Comment: Section 6. The effects of automatic calibration and correction do not appear to be anticipated in this proposal. In one of our typical automated CEMS's, the zero and span check values from all instruments are individaully recognized and the appropriate zero and span calibration correction can be applied to all succeeding data until the next calibration cycle. In this case, no readjustment of zero and span should be necessary until the correction exceeds the manufacturer's recommendation. This means that no zero or span drift would be seen in the final reported emission values.

Your proposal to eliminate the potential advantages of automatic calibration correction eliminates one of the more cost-effective tools with which the instrument designer has to work -- digital electronics. We recommend that automatic correction be allowed, but with qualification. When automatic correction is allowed, the automatic correction should be monitored and the drift in correction should not exceed three times the normal drift allowance, provided that the corrected output is less than one-third the normal drift allowance.

Response: We are not disallowing auto correction. All we are asking is how much is the correction.

6.9 Comment: I would like to point out that qualification of the zero and span drift integrity has been included and is existing for opacity monitors -- but not gas analyzers. In 60.13(d), it states that, "Such procedures shall provide a system check of the analyzer internal optical surfaces and all electronic circuitry, including the lamp and photodetector assembly." Unfortunately, the intent of this statement is admirable, but it is openly violated by at least one model of transmissometer which has been "certified" in some applications and tacitly approved by the EPA. This fact is primarily important from the fact that EPA must establish a reasonable floor for instrument performance and apply it uniformly or the market will become distorted by less expensive imitations which can get by and will be purchased on a strictly cost-selection criteria. The eventual outcome of such actions is an unhappy user and data of less real integrity than that specified.

Response: The specification in 60.13(d) for opacity monitors is given because there is no easily applied RM for transmissometers. Manufacturers of different instruments can request a determination if certain procedures meet the intent of the regulations in principle. Approval of such procedures, however, does not "certify" the instrument nor does it mean that the instrument will continuously operate with or without loss in integrity.

6.10 Comment: The argument with respect to whether the span calibration check should be done near mid-scale, 50 percent

or full scale, 90 percent, is somewhat mundane. From a technical standpoint, the closer the check is to full-scale, the better will be the check of the real span drift component as opposed to zero drift. From the practical viewpoint, the span check material is relatively difficult (costly) to manufacture to a specific value. Since the desired effect is to ensure accuracy in the vicinity of the emission standard, we would suggest that the span check be performed at a value which is a minimum of 1.5 times the emission limit.

Response: See Response 1.1.

6.11 Comment: In PS 2, paragraph 6, you have specifically allowed a single-point incremental addition type check of instrument drift. It is very easy to prove that it takes two points, at a minimum, to define a linear calibration function. Normally, these two criteria are defined as gain and offset, which correspond to EPA's typical span and zero parameters, respectively. By using only a one-point definition of a calibration function, you have made it impossible to predict the performance of the instrument at any other point on the calibration "curve." We strongly recommend that a single-point drift check only be allowed if the user can show that either the zero/offset or gain/span characteristic is stable (non-variable) and predictable for that individual instrument. It should be noted that all gas analyzers

can be designed to incorporate a zero and span check. In some designs, it is more expensive than others, but this should be a required characteristic if the EPA really desires a consistent specification which will ensure a reasonable degree of accuracy. We would recommend that the EPA consider the experience of Pacific Gas and Electric in San Francisco in their attempt to obtain reasonable performance from their across-stack gas analyzers. It is our understanding that the rotating zero pipe has been necessary to accurately define the performance of such systems. A paper was presented on the subject at the 1979 APCA Show by Bob Webb of Pacific Gas and Electric.

Response: We agree that a single-point drift check should be allowed only if the user or manufacturer can show that either the zero/offset or gain/span characteristic is stable and predictable for that individual instrument. In the case in point, the vendor did exactly that. It is our understanding that the one-point check was sufficient to determine calibration drift.

6.12 Comment: It is not clear what the allowable zero and span drift are without adjustment, considering that the PS 2 criteria involve statistical means and confidence intervals. These data are not readily available on a day-to-day basis.

Response: Section 4.2 specifies the allowable zero and span drifts. The specification criteria do not involve statistical means and confidence intervals.

6.13 Comment: It appears from this and previous proposals that the EPA has assumed all devices are equally inadequate, not capable of being easily checked with a high degree of integrity or predictability, and have settled on a rigorous correlation with RM's as the only method of determining compliance with basic accuracy requirements. This means that all measurement techniques, even those including the highest degree of built-in verification means, must also comply with the most costly means of verification (RM testing) which are really only relevant to the instruments with the least capability. In the interests of our economy and the often-suggested high cost of environmental monitoring, we sincerely believe that it is necessary for EPA to consider lower cost means for certification of instruments with greater capabilities for verification. From another viewpoint, it may be much more desirable for a user to purchase more instrumentation verification capability on the front end to reduce future certification, maintenance and QA costs. Additionally, it is certainly much more inexpensive to purchase and use traceable calibration gases than to become involved in repeat testing according to RM's 6 or 7.

At the current time and under the proposed rules, there is no incentive to evaluate this trade off, since all devices are assumed to be

marginal and certification costs are the same high value for all devices. For example, all across-the-stack devices could be equipped with rotating zero pipe facilities to provide zero and span checks with a high degree of integrity. Without this calibration means, one is justified in mandating rigorous RM testing in order to ensure accurate results. Another example involves the use of NBS traceable zero and span check reference materials. With nontraceable materials, one is left with a high degree of suspicion regarding the meaning and integrity of such calibration checks. With traceable references, the calibration checks can provide much higher real calibration accuracy. A third example involves the potential validity of a dynamic calibration check, using NBS traceable gases at stack temperature and pressure. Without this means, a high degree of RM testing may be necessary to ensure valid results. With this capability, the use of traceable gases can provide a higher degree of integrity than will ever be achieved with wet-chemistry, operator-dependent, RM's. We would welcome the opportunity to discuss the above options with the EPA in more detail. We would like to make it clear that we believe that we can ensure a higher degree of accuracy and substantially lower certification costs (50 percent) if the EPA will consider certification means which are more proportionate to the inherent built-in or installed capabilities of the instrument.

Response: The Agency has not assumed that all devices are equally inadequate. If this was true, then EPA would not have required the use of CEMS for monitoring purposes or for continual

compliance purposes. The Agency has concluded that the best means of checking the instrument for accuracy is the RM tests. This, however, does not preclude alternative and cheaper means to be used for checking RA. Those measurement techniques with "the highest degree of built-in verification means" would be more likely to be approved than those with the lesser capabilities. And EPA will consider lower cost means for certifying instruments if it is adequately demonstrated that such procedures will provide the proper evaluation. The QA procedures can be used for these demonstrations.

The EPA encourages users to consider those CEMS's that can easily verify the accuracy, which would reduce future certification and QA costs, in addition to its demonstrated reliability and cost of maintenance.

We agree that the use of traceable calibration gases is less expensive than to become involved in repeat testing using RM's 6 and 7. However, it should first be established that the traceable calibration gases are sufficient to insure the required accuracy. See Response 6.2.

As was mentioned in the preamble to Subpart Da, EPA will be proposing QA procedures to require the determination of precision and accuracy of the CEMS. These procedures should provide the incentive to obtain reliable instruments.

6.14 Comment: We believe your proposal is weak in one other area, which is necessary to ensure accuracy measurement at emission levels other than the one encountered during RA testing. This is the area

of linearity, or nonlinearity, as the case may be. We would recommend that the linearity or nonlinearity should be documented by the equipment manufacturer at the factory. We would recommend that if the manufacturer represents an instrument as having a linear calibration curve, that a test similar to your existing RA test be performed, except that that data should be evaluated in terms of its deviation from a straight line. For such linear instruments, the maximum deviation should not exceed ±3 percent of span. For nonlinear calibration curves, the vendor should demonstrate that the published nonlinear curve is accurate to within ±3 percent of span for that individual instrument. The NBS traceable materials should be required for this test. The calibration may exclude temperature compensation if such can be shown not to affect the linearity or nonlinearity of the system. The manufacturer should thus provide, in essence, a certificate of calibration. Further, the manufacturers' maintenance procedures should be directed toward verifying or maintaining the given calibration function.

Response: The Agency agrees that linearity or nonlinearity should be established and periodically verified. However, EPA is leaving the option of whether to have such procedures or certifications to the user.

6.15 Comment: We definitely believe that these proposed regulations and revisions should not be applied retroactively. It may be reasonable

to make them effective for instrumentation purchased after the date of the proposal, but certainly not broadly retroactive. The basic reason for this concern is the revised RM certification testing which could require changing the installation site in some circumstances, and the tighter accuracy specifications which are inherent with the proposed consideration of pollutant and diluent monitor, ppm to lb/MBtu conversion, and recorder, as a system which must fall within the same error band as previously allowed for just the pollutant monitor. There are substantial changes which become even more significant when considered in light of the potential errors and costs associated with the RM testing. It may be reasonable to mandate updating to this specification within 5 years after date of the initial certification.

Response: See Responses 5.1 and 8.3.

6.16 Comment: Section 2.6. The validity of the "established reference value" is totally undefined, as discussed previously. Such values can be estabished to provide minimum measurable or visible drift, or to provide a valid check of the operation of the entire measurement system.

Response: This is the reason that RA tests are conducted with RM's. See also Response 6.7.

6.17 Comment: Section 2.1.4 The last sentence needs to be expanded as follows: "The data recorder may include automatic data reduction and correction capabilities."

Response: Automatic data reduction does not preclude correction capabilities. The suggested addition need not be made.

6.18 Comment: Section 4.1. The single-point calibration drift determining technique is wholly unsatisfactory, as previously discussed, unless the operator can show that the offset or gain of the system is nonvariable. There is a noticeable inconsistency here in that you have tacitly allowed single-point calibration checks without qualification and are, at the same time, specifying overly tight limits on the range of allowable zero and span limits. If checking is not possible at zero and span, the lower value should be between 0 and 33 percent of full scale, and the upper between 66 and 100 percent.

Response: See Responses 6.11 and 1.1.

6.19 Comment: Section 5.2. There should be no restriction for plant operating capacity as proposed. It may be reasonable to require that the plant operate at more than 50 percent capacity for at least 3 days out of 7, but certainly not all the time.

Response: See Response 5.11.

6.20 Comment: Section 5.3. (a) The CD and RA tests should be allowed to be conducted simultaneously to reduce costs. (b) One test failure does not generally invalidate the results of the other. (c) The last sentence could be somewhat restrictive depending on the meaning of the word, "demonstrated." We prefer that the last half of the sentence be modified to state, ". . . unless the zero and span calibration check values are shown to be unaffected." If one part of the system fails, the RA testing should be allowed to be completed for the remaining available data, as long as no more than one major system component has failed. (d) We would propose that for diluent/pollutant measuring systems, the error criteria be tightened up by $1/\sqrt{2}$ or 0.707, compared to the combined system tests. Thus, an individual diluent monitor could be certified at 0.707 times 20 or 14.14 percent error allowance, as could the pollutant monitor alone.

Response: (a) See Response 5.12. (b) It is true that one test failure does not generally invalidate the results of the other. This depends on the system. (c) As mentioned earlier (see Response 6.2), the suggested modification is not sufficient to ascertain whether adjustments made to one channel does not affect the others. This also includes failure of major components. The degree of restrictiveness of the word "demonstrated" depends on the particular CEMS. (d) See Response 8.3.

6.21 Comment: Section 7.1. It is very important that if the plant operating conditions, such as load, fuel and excess air, are not reasonably constant (±10-20 percent) during the RM tests, and that the diluent, pollutant and moisture are determined as near simultaneous as possible.

Response: See Response 3.1.

6.22 Comment: Section 7.3. We support the note in this paragraph.

Response: None required.

6.23 Comment: Section 3.2 of PS 3. We question the accuracy of Method 3 in its basic form. In particular, this is an area where a dynamic calibration check, using NBS traceable gases, should be allowed in lieu of Method 3, if the diluent analyzer is tested alone per the tighter-suggested RA error allowance (14.14 percent).

Response: See Responses 6.1, 6.2, and 8.3.

Commenter VI-D-8

8.1 Comment: These comments on the proposed revisions are submitted on behalf of the Utility Air Regulatory Group (UARG). The UARG is composed of the Edison Electric Institute, the National Rural Electric Cooperative Association, and 85 individual electric utilities. A list of UARG's members is enclosed as Enclosure 1.

The UARG filed comments on the October 10, 1979, proposed revisions in December, 1979. Our review of the reproposed PS's indicates that the Agency has responded to several of the earlier UARG comments.

We would like to suggest certain additional changes which appear necessary as a result of the changes which the Agency has made since the earlier proposal. The UARG comments are discussed in some detail in Enclosure 2. I would like to take the opportunity to briefly summarize in this letter some of the more important comments.

Continuous monitoring technology is a developing science. The problems with monitor accuracy and reliability have been well documented by both UARG and the Agency. Given the state-of-the-art of monitoring technology, it is critical that any PS's be flexible enough to allow sources to respond to unanticipated problems and special circumstances. We, therefore, applaud the increased flexibility which the Agency has introduced in the reproposed PS's. At the same time, however, we encourage the Agency to issue at an early date the monitoring guidelines referred to in the January 26, 1981, Federal Register publication, in order to provide vendors, purchasers, and operators of continuous monitors with supplementary equipment and performance specifications. While we agree that the state-of-the-art is not adequate to incorporate more specific guidelines in regulatory language, more detailed guidelines would be helpful as a starting point for continued discussions among the Agency, monitor users, and monitor vendors.

While we agree with the general approach taken in the reproposed revisions to Appendix B, we have a variety of concerns with particular aspects of this reproposal. These concerns are listed briefly in the following comments.

Response: The CEMS guideline document was available on January 26, 1981. However, based on the comments received during the comment period of this rulemaking, the document will be revised and republished as soon as possible.

8.2 Comment: The reproposed PS's address only the location of outlet monitor systems. For sources with pollution control technology, an inlet as well as an outlet monitoring system may be required. The Agency, therefore, must revise these reproposed PS's in order to account for questions concerning location and testing of inlet monitor systems, and propose these specifications for public comment.

Response: The text has been revised to address inlets to control devices. However, we do not feel it is necessary to propose these specifications for public comments as the same principles apply as to obtaining representative samples. In addition, the revisions should not pose any problems.

8.3 Comment: The problems with continuous monitor accuracy are well documented. In spite of these well-known problems, the reproposed specifications require that both pollutant and diluent monitors in combination meet the $\pm$20 percent accuracy requirement, even though the existing PS's only require the pollutant monitor to meet these accuracy problems. In addition, the reproposed specifications eliminate the 10 percent location error allowed in the October 1979 proposal. We do not understand the basis for this departure from the existing PS's

and earlier proposal. In light of the well-known problems with monitor accuracy, the Agency should allow ±10 percent error for monitor location, as well as an error for diluent monitors.

Response: In the October 6, 1975, PS's, only the individual pollutant monitors were required to meet the specified RA. No accuracy requirement was placed on the diluent monitors. This was an error on EPA's part. At that time, EPA felt that the zero and span checks were sufficient to ensure that the concentrations obtained by the monitor would have yielded results within ±0.5 percent O_2 or CO_2. However, experience has shown that this was not the case.

The combined accuracy requirement is more restrictive. However, as mentioned in the preamble, this requirement is not unattainable. The Agency has reviewed a number of RA tests where the combined systems were checked. Of the 24 tests that were reviewed, 13 improved its RA and 11 got worse. But only two would have failed as a result of the combined specification and five would have passed while failing the pollutant monitor RA. The point is that CEMS's are capable of meeting the combined specification.

Some monitors which presently meet the existing RA specifications may not be capable of complying with the proposed accuracy specification. However, this could be a result of monitor deterioration or lack of maintenance. If a CEMS cannot be corrected outside of full system replacement, the system is probably so inaccurate that it serves no

useful purpose and would be advisable to have it replaced; the remedy is not to increase the relative error specification.

The ±10 percent criterion used in the definition of stratification was not an allowance for error. The entire context of Section 4 of the October 5, 1975, specification (40 FR 46250) is that the sampling location should be representative of the emissions. Section 4.1 states, "For sampling locations where effluent gases are . . . nonstratified, a point or path of average emissions may be monitored." Section 3.2 of the October 10, 1979, proposal (44 FR 58602) states, "The tester may . . . conduct the stratification check . . . to select the point, points, or path of average gas concentration."

8.4 Comment: The Federal Register proposal states that "some commenters erroneously assumed that QA procedures were an integral part of the specifications." The Agency, therefore, concludes that it is unnecessary to issue QA procedures before finalization of the PS's. The UARG remains convinced that until we understand the procedures which are required to maintain monitor accuracy over time, application of detailed PS's at the time of monitor installation provides no guarantee of continued monitor accuracy. We understand that there is little data at this point on which the Agency could base the development of QA procedures. The Agency, however, should recognize the seriousness of this issue in any PS's it issues.

Response: The PS's are not designed to evaluate the CEMS over a long period of time. Neither are they designed to establish the adequacy of QA procedures that are to insure valid short-term and long-term

monitoring data. The PS's merely specify what is expected of the instrument, e.g. in PS 2, the calibration curve should remain stable and the measurements should be accurate within ±20 percent when compared to the RM's. The PST provides the check necessary to determine whether the CEMS is within the requirements at the time of the initial installation. The QA procedures are intended to demonstrate that the CEMS is properly maintained. Because EPA recognizes that neither the PST nor the PS's guarantee continued monitor accuracy, EPA is developing the QA procedures to evaluate the CEMS over longer periods of time. If the user desires to include an evaluation of the CEMS over a long period of time along with the initial PST or to institute other procedures, he may choose to do so. He may also choose to include procedures to insure that the selected sample point(s) remain representative, or unbiased, with respect to total emissions.

8.5 Comment: The UARG is concerned with how the location procedures specified in the reproposed specifications will affect new units. While the application of these procedures to existing units is possible since testing can be done, a new unit will need adequate time to test monitor locations after the unit starts up. Industry experience indicates that monitor installation and the testing required to establish a proper location can take 1 year or more after the initial startup and debugging. The PS's should deal with this concern, and other regulations may require modification as a result of these proposed procedures.

Response: Taking a year or more to establish a suitable location is unusual. However, if delays in meeting the present requirements are justifiable, Section 60.13(i) may be used to establish alternative requirements.

8.6 Comment: The reproposal does not specify that the drift test procedures, and the results of the drift test must be approved prior to the RA test. If the Agency reviews apparently successful calibration drift tests after the completion of RA tests; and, if upon such review, the Agency determines that the procedural requirements and specifications of the drift test was not achieved, sources may be required to repeat both the drift and accuracy tests. To help avoid this type of situation, we recommend that sources be given the discretion of having the procedures and results of the drift tests evaluated and approved by the applicable agency before initiation of RA testing. The timing for such approval should be decided by the source, since they will be taking the liability for having to reconduct all tests if it is later found that the drift test was failed.

Response: The PS's do not prohibit such discretion.

8.7 Comment: The CD test is based on a single measurement of a calibration gas or gas cell each day. Since the imprecision of any one measurement could cause a monitor to fail the drift specification, it is recommended that calibration medium(s) be analyzed three times each day by the subject monitor and that the results of the three analyses be averaged and compared to the reference value of the

calibration medium to determine CD. This repetition of analysis should minimize the possibility of imprecision causing drift test failure.

Response: The imprecision is considered in the CD specification; therefore, averages need not be used.

8.8 Comment: The drift specification, 2.5 percent of the span value is an absolute specification, i.e., 25 ppm drift is 2.5 percent of 1000 ppm span and 12.5 ppm is 2.5 percent of 500 ppm, etc. The absolute specification may be adequate for detecting a parallel shift of the calibration curves away from the initial, or accepted, calibration curve. However, if the slope of the calibration curve changes or "drifts," the absolute drift specification may be inadequate to quantify the actual drift at the calibration or span range. For example, when the slope of the calibration curve changes by 2.5 percent, the CD will show a 25 ppm change at the 1000 ppm level, 22.5 ppm at the 900 ppm level, 20 ppm at 800 ppm, and 17.5 ppm at 700 ppm. As seen here, determination of compliance with an absolute drift specification can vary when differing calibration values are used for the drift test. We suggest that in order to more accurately assess CD, the drift specification should be expressed relative to the value of the calibration gas or gas cell.

Response: The CD value does not vary with the calibration values. The "span value" is fixed and specified in an applicable subpart of the regulations.

8.9 Comment: The calibration error specification is important in evaluating monitor performance at sources that exhibit variable pollutant concentrations. Although the RA test is useful in evaluating monitor performance at any one concentration level, the calibration error test is the only means of evaluating the calibration response of monitors over the full measurement range. Therefore, the calibration error specification should be included in the reproposed specifications.

Response: The primary criterion of the PS is the RA test using RM's. When purchasing a CEMS, the user may choose to include a calibration error specification.

Commenter VI-D-9

9.1 Comment: Section 60.13(b). I concur with the Agency that it is not necessary to write a regulation that would require a pretest to a test.

Response: None required.

9.2 Comment: Section 60.13(c)(2)(ii). I feel that the "±20 percent with a confidence level of 95 percent" should be referenced to an applicable standard, since it is unlikely that any monitoring equipment would be able to maintain this error at the minimum detectablility of the monitoring equipment.

Response: The PS includes a ±10 percent of emission standard criterion to account for errors at the minimum detectability of the CEMS.

9.3 Comment: Section 60.13(d). The requirement for daily zero and span drift is unnecessary since the regulation already requires the operator to follow the manufacturer's recommendation and also minimum standards are specified in Appendix B.

Response: The requirement for daily zero and span drift is for long-term basis. However, Appendix B does not address the long-term issue. Although the regulation requires the operator to follow the manufacturer's recommendation, this paragraph sets the minimum requirement.

9.4 Comment: Section 60.13(d). I do not believe the EPA has any basis for determining the optical surface of opacity monitors must be cleaned once the zero compensation exceeds 4 percent opacity. This requirement does not allow the manufacturer any flexibility. The optical surface should be cleaned as per the manufacturer's recommendation.

Response: The 4 percent is thought to be the minimum percent opacity needed to assure proper quality of data. This specification guides the manufacturer's recommendation as to how often it should be cleaned.

Commenter VI-D-10

10.1 Comment: The proposed revisions to Section 60.13 of the General Provisions make this section consistent with the proposed revisions to Appendix B. We have no comment with respect to these proposed revisions.

Response: None required.

10.2 Comment: We support the proposed revision which would allow for the complete evaluation of SO_2 and NO_x CEMS's after they have been installed at operating facilities. The proposed PS tests should, therefore, be less costly to perform relative to current PS requirements.

Response: None required.

Commenter VI-D-12

12.1 Comment: We are a member company in the UARG and wholeheartedly support the comments on this subject submitted by them. Therefore, our comments will be in addition to those filed by UARG.

Response: None required.

12.2 Comment: Although this latest proposal is drastically different from previous EPA proposals and has the potential to shift the bulk of the burden to prove the accuracy and reliability of CEMS from the vendor to the user, we are generally in favor of this approach. But we do have reservations.

Response: None required.

12.3 Comment: Prudent specifications of conditions and requirements in user purchase agreements may effectively swing this burden of proof back to the vendor. However, it remains to be seen if the vendors will attempt to meet instrument specifications included as part of a purchase agreement if those specifications are not required by regulations. In fact, our experience to date with conditional purchase agreements has been less than promising. The vendors were reluctant to agree to this procedure even when we had the previous proposal (October 10, 1979) and an EPA sponsored research project to back us up. This reinforces the

position that the EPA should issue the guidelines covering monitor specifications and test procedures that were discussed in the preamble in a timely manner. At least then, the vendors and users will have an official definitive document on which to base these conditional agreements.

Response: See Response 8.1.

12.4 Comment: Even though we are in general agreement with the overall content of the proposal, we would like to point out a few specific points that need further clarification before the proposal is promulgated. These comments follow.

a. The proposal is apparently not intended for sources subject to Subpart Da requirements or those sources required to have SO_2 scrubbers, since it precludes locating an SO_2 scrubber inlet CEMS and determining its RA. If the EPA intends for this proposal to be applicable to sources subject to scrubber installations, then more effort should be extended in meeting that objective. Unless another proposal is forthcoming that will cover these sources, we recommend that the EPA rewrite this proposal to incorporate inlet CEMS testing.

b. The determination of the CEMS RA contains a number of possible errors that must be combined into one final accuracy number. The sources of these possible errors are the inaccuracies associated with the CEMS location, the inaccuracies associated with the pollutant monitor, the inaccuracies associated with the diluent monitor, and the inaccuracies associated with the RM.

By allowing more leeway in choosing a CEMS location, the EPA has increased the possibility of it being more accessible than previous proposals would dictate. No effort is to be made to determine if the flow is stratified or not, and no provision is provided for this purpose. Therefore, the ±10 percent location error allowed by the last proposal (October 10, 1979) must be incorporated in the CEMS RA determination. If stratification does exist, this error could be significant.

Also, the pollutant monitor and the diluent combined monitor are now considered the CEMS and are subjected to the RA determination as such. The previous proposal (October 10, 1979) allowed 20 percent for the pollutant monitor alone; therefore, the EPA must have already recognized some limits in pollutant monitor accuracies.

Finally, the RM, itself, may cause other errors of differing values depending on technique, familiarity, and other nondefinitive problems. Though considered accurate in itself and since it is a RM, there can still be a number of possible errors.

We doubt that the CEMS can be depended upon to meet the accuracy requirement of ±20 percent when it must incorporate them all into one accuracy number. We also question whether the CEMS should be subjected to this sum total of possible errors in determining their accuracy. We recommend, at the least, requiring a separate accuracy determination for the pollutant monitor and one for the diluent monitor.

Response: See Responses 8.1 and 8.2. In addition, the PS does not prohibit stratification checks. This option is left to the user. The October 1979 proposal included the diluent monitor as part of the CEMS (see Section 5.1).

Commenter VI-D-13

13.1 Comment: Section 5.2. We strongly oppose the "more than 50 percent capacity" provision because it would make it impossible for certain units to comply. Such units are those that were overdesigned by more than 100 percent for future considerations. We suggest that calibration tests be conducted while the affected facility is operating at 50 percent of its normal load.

Response: See Response 5.11.

13.2 Comment: Section 4.1. We anticipate difficulties in complying with this provision because span gas suppliers often provide span gas which is only within ±10 percent of what we have requested. For this reason, we suggest a span level of 80 to 100 percent.

Response: See Response 1.1.

13.3 Comment: Proposed regulations delete the current requirements to offset the zero setting by at least 10 percent of the span during calibration tests (Sections 6.2.1 and 6.2.2 of the existing PS 2). We support the deletion for the following reasons. First, some monitors can be offset by only up to 5 percent. Second, offset of the zero setting invalidates span settings and causes a nonlinear relationship between the two settings.

Response: None required.

13.4 Comment: Section 60.13(d). The proposed quantification and recording requirements for zero and span drift create unnecessary paperwork. Such an investigation can be conducted as the need arises on an informal basis.

Response: The recording is not a proposal but is presently required under Section 60.7(d). The section has been revised to quantify the amount of excess zero and span drift, when specified.

13.5 Comment: In general, we are in agreement with the proposed concept to simplify and improve procedures for determining pollutant concentrations and for evaluating continuous monitoring systems.

Response: None required.

COMMENTS ON OTHER VIEWS

The preamble of the January 26, 1981, proposed rules, under "Request for Comments on Other Views," stated: "A number of suggestions were received which were not incorporated in these revisions. Because they represent differing views, EPA requests comments on them to determine what course of action should be taken in the final rulemaking." The following are the comments that were received and EPA's responses.

1. Mandatory Conditioning Periods

a. VI-D-2. Although we believe that a conditioning period is beneficial for identification of operational problems prior to committing funds and personnel to a test program, we see no need to include a conditioning period as a mandatory requirement.

b. VI-D-5. While we agree with the suggestion of a conditioning period with the length determined by the anticipated use of the CEMS, we do not feel it should be mandatory. Conditioning periods would tend to reduce the need for variances if the CEMS goes "unreliable" immediately after an RA test is conducted 1 day after startup, but are not necessary for those who have a great deal of experience in a particular application.

c. VI-D-6. Eliminating the 7-day conditioning period leaves the burn-in requirements to the operator and equipment manufacturer to define. This allows more flexibility, a possible reduction in cost, and should not have a significant effect on the integrity of the tests.

d. VI-D-10. Provisions of Section 60.8 require that NSPS testing be conducted within 60 days after the date when full production is achieved. Under these circumstances, a requirement for CEMS's to be installed and operational 60-90 days prior to NSPS compliance testing could actually conflict with activities associated with bringing the unit up to full capability. Therefore, we urge that CEMS installation and operation 60-90 days prior to NSPS compliance testing not be required.

e. VI-D-11. Due to the high cost of certifying a CEMS, a source will want to insure that the system is functioning properly prior to arranging or initiating a compliance certification test. We recommend that EPA suggest that source adopt a 30-day conditioning period before initiating a performance test. By incorporating a longer preliminary period, there should be a greater chance of a CEMS passing the performance test. The longer conditioning period would also allow plant maintenance personnel an opportunity to become familiar with the system under actual field conditions. We believe that these benefits clearly outweigh having a fixed conditioning period established by regulation and recommend the mandatory 7-day conditioning period be excluded.

f. VI-D-13. While we do not see a necessity for a separate conditioning requirement for operation and compliance purposes, we strongly recommend that the mandatory conditioning period requirement be retained and perhaps even made longer. Retention and expansion

of the mandatory conditioning period is important and needed because of persistent plugging problems. A conditioning period requirement will provide additional impetus for vendors to supply reliable systems and will help insure that approved systems will continue to operate satisfactorily.

Response: Five of the six commenters felt that the conditioning periods were beneficial but should not be made mandatory. Therefore, the requirements and verification of operational status have been left to be determined between the manufacturer and the source owner or operator.

2. Mandatory 3-Day RA

a. VI-D-11. We disagree with the view that RA tests should be spread over 3 days instead of 1. Considering that most stack sampling consultants base their fees on time spent in the field plus expenses, we believe that the requirement to extend the sampling time is unreasonable. We assume that by extending the sampling over 3 days, the objective would be to obtain data that would be more representative of actual source emissions. The objective of the RA tests is to insure that the pollutant concentration, measured by an appropriate RM, is statistically similar to pollutant measurements obtained from the CEMS. We see no benefit in extending the sampling period. However, if the objective is to vary the pollutant emission concentration, other means should be employed.

Response: The objective of the RA tests as mentioned by the commenter is correct. Therefore, the specification was not changed to mandate a 3-day RA. The present specifications allow the RA tests to be conducted over a minimum of 4.5 hours. However, no maximum is set. Therefore, the 3-day option is open to the source owner or operator, should he desire to extend the test period.

3. Concurrent NSPS and PS Tests

a. VI-D-2. We agree that NSPS compliance tests and CEMS performance tests should be conducted simultaneously in a manner so as to be acceptable as NSPS compliance tests.

b. VI-D-5. Source operators should be given the option of conducting CEMS PS tests and NSPS tests concurrently. However, we disagree with the suggestion to mandate concurrent testing.

c. VI-D-6. The option to combine tests should be left open to the operator, but the tests are sometimes performed under different test conditions.

d. VI-D-13. Use of results from a concurrent test would save resources. For this reason, we support integration of the concurrent test provision in the final regulation.

Response: Two commenters felt that simultaneous NSPS and PS tests should be mandated; two commenters felt that they should not be. The proposed specifications allow simultaneous testing. If simultaneous testing is economically advantageous, source owners or operators would naturally do it without being regulated. Mandating

simultaneous testing could increase costs, e.g., if the CEMS breaks down during the PST, both tests would have to be halted. However, leaving the option as is, the performance testing could proceed and the PST conducted at a later date.

4. CEMS Calibration Checks

a. VI-D-2. Failure to periodically introduce calibration gases as close to the point of sample acquisition as possible could result in inaccurate data due to deterioration of the sample transport system. If the calibration checks are not conducted in this manner during performance testing, the CEMS may still meet the required RA but be subject to an unidentified leakage in the sample transport system which could vary with time and ambient conditions. Our experience with sources that have installed extractive CEMS's indicates that the requirement to introduce the calibration gases at the probe is not unduly burdensome and does not result in a significantly higher cost than for introduction at the analyzer.

b. VI-D-5. We agree with the concept of checking the entire CEMS starting at the probe for extractive systems. However, this type of check is difficult to implement and can yield misleading results. If the system runs at negative pressure, the calibration cylinder pressure must be adjusted to properly balance the system pressure to normal operating conditions. If the cylinder regulator pressure is too high, leaks will not show up because the system will be pressurized. For systems that have a sample pump near the probe, the need for a

daily check is minimized because a small leak on a positive pressure system will not affect analyzer response. If diluent measurement is done simultaneously, leaks may be corrected for twice.

Sample losses due to adsorption or absorption will be minimal if proper materials are used, again minimizing the need for a daily system check.

Most calibration gases purchased in aluminum cylinders will not change concentration significantly over periods much longer than 6 months. Only an initial calibration gas calibration check should be required provided the source operator uses certified gases in followup QA/RA tests.

c. VI-D-6. We concur with the opinion that zero and span gases should be introduced at the stack in extractive systems to verify the entire measurement system integrity.

d. VI-D-13. We agree with the EPA analysis that the RA test would validate the CEMS regardless of the location for introducing calibration gases into the system. We are opposed, however, to a requirement which specifies the location at which calibration gases are introduced. A requirement to introduce calibration gases at a probe located at the stack wall would require either long calibration gas supply lines or would require another person since monitors are usually located at some distances away from the probe. This is unnecessary.

Response: The EPA reconsidered requiring the introduction of calibration gas mixtures at the probe at the stack wall, but determined that such a requirement would be inconsistent with the basis for the reproposal, i.e., comparisons against the RM's determines the CEMS's acceptability. However, EPA agrees that checking the whole system including the interface is desirable and, with proper demonstration, could replace the comparisons against the RM's. Mention of its desirability will be made in the guideline document.

5. Performance Specifications

a. VI-D-2. The comments on audit and data recovery are very apropos and should serve to illustrate to EPA that QA procedures are an integral part of these specifications. It is naive not to recognize that QA specifications do govern CEMS design and evaluation and more naive not to account for all operational requirements before selection and installation of CEMS.

b. VI-D-5. For very low emission rates, the RA requirement of 10 percent of the applicable standard is within our CEMS sensitivity. However, an alternative to consider is to allow RA within 5 percent CEMS full-scale for low emission rates.

c. VI-D-6. We concur with decreasing value of the accuracy of emissions as they approach zero. We believe the external check is extremely desirable if one is to ensure valid measurement data. The minimum data recovery specification is certainly desirable from a user's standpoint, however, vendors will raise the associated costs

to cover their risks. It would help differentiate reliable from unreliable equipment and vendors.

d. VI-D-13. We oppose a minimum data recovery specification of at least 18 hours in at least 22 out of 30 days for two reasons. First, it would mean that a minimum of 30 days is needed to complete a source test. This is a long test by itself. Second, there would be less time to comply with the "within the 60 days after achieving the maximum production" provision.

The fixed percentage specification for determining RA, ±10 percent of the applicable standard, is inherently biased against the sources combusting relatively clean fuels. Hence, we recommend a use of a sliding scale which relaxes the subject specification for sources having to meet low emission standards.

Response: These comments have to do with evaluating the reliability of the CEMS over a long-term basis. See Responses 2.1, 5.3, and 5.14.

Concerning the sliding scale which relaxes the required accuracy when emission standards are low, EPA agrees that the RM variability needs to be considered. At present, the only low emission standard is for SO_2 (Subpart Da). Therefore, Section 4.3 has been revised to allow greater relative errors at these levels.

6. Separate vs. Combined Units of Measurement

a. VI-D-5. We agree that all units should be recorded, but only the regulated quantity needs to be reported.

b. VI-D-6. We recommend this from the standpoint of backup. If the ppm to lb/MBtu conversion fails, one would have a backup position with a recording of raw data.

Response: Since the recording of separate units is viewed as backup in nature, this option should be left to the owner or operator. If it is advantageous, then this would become normal procedure without being regulated.

7. The RA Terminology

a. VI-D-5. The term "relative accuracy" is defined accurately in the definitions, so we would leave the term the same even though the commenter is accurate in stating that an RA test determines the relative error between the reference test and the CEMS.

b. VI-D-6. This is somewhat academic in that error and accuracy are often used interchangeably. The $\pm$20 percent requirement is obviously an error allowance.

Response: Both comments are correct. Since a change could cause confusion, the use of the terminology will not be changed.

8. Outlier Rejection Technique

a. VI-D-2. In order to allow an agency to assess the true results of RA testing, results for all tests conducted should be required to be submitted, along with reasons for requesting deletion of any data. The Agency should make the final decision as to deletion of data and should use the results for all acceptable tests in calculating the RA of the CEMS.

b. VI-D-5. We agree that the tester should be allowed to reject up to three samples in determining RA tests results. While it is probably true that the tester will throw out the three tests that increases his RA, he will also have the discretion to throw out results that do not appear reasonable.

c. VI-D-6. We highly recommend this. Specific stack samples are often obviously faulty or erroneous. A stack sampler should be able to take extra samples to allow for an occasional mistake. This will, in effect, reduce the risks and costs of performing Method 6 or 7. Any one sample should be able to be eliminated without specific justification. Elimination of more than one sample value should be left to the subjective analysis of the data by the user.

d. VI-D-11. We recommend that statistical techniques be used to reject outliers, rather than an arbitrary decision on the part of the tester. However, test results that are outliers because of testing difficulties or source operating conditions should be rejected without being subjected to statistical techniques.

Response: The Agency originally decided that a data set of a minimum of nine samples was sufficient to evaluate the CEMS. Statistical techniques for outliers within the set of nine were investigated, but were found to be too restrictive because of the small sample size. The proposed technique does not allow any rejection of data from the set of nine, but allows the replacement of up to three samples by other samples. Since the evaluation involves

a comparison of two methods, EPA feels that the proposed procedure is satisfactory for rejecting outliers.

TABLE 2. LIST OF COMMENTERS

Docket No. OAQPS-79-4

Docket item no.	Commenter/Affiliation
VI-D-1	Joe Francis, Environmental Specialist State of Nebraska Department of Environmental Control Mail Box 94877 Statehouse Station Lincoln, NE 68509
VI-D-2	James K. Hambright, Director Bureau of Air Quality Control State of Pennsylvania P.O. Box 2063 Harrisburg, PA 17120
VI-D-3	Richard H. Russell, Environmental Sampling Supervisor Owens-Illinois, Inc. P.O. Box 1035 Toledo, OH 43666
VI-D-4	Russell O. Blosser, Technical Director NCASI 260 Madison Avenue New York, NY 10016
VI-D-5	David J. Williamson Pacific Gas and Electric Company P.O. Box 7442 San Francisco, CA 94106
VI-D-6	Gerald F. McGowan, Vice President, Engineering Lear Siegler, Inc. 74 Iverness Drive East Englewood, CO 80112
VI-D-8	F. William Brownell for Utility Air Regulatory Group Hunton and Williams 1919 Pennsylvania Avenue, N.W. Washington, D.C. 20036
VI-D-9	J.L. Bechthold, Manager Regulatory Compliance and Services Northern States Power Company 414 Nicollet Mall Minneapolis, MN 55401

TABLE 2. LIST OF COMMENTERS

(Continued)

Docket No. OAQPS-79-4

Docket item no.	Commenter/Affiliation
VI-D-10	Mark P. Steinberg, Superintendent Air Quality Division Environmental Department Wisconsin Electric Power Company 231 W. Michigan Milwaukee, WI 53201
VI-D-11	F.W. Chapman, Jr., Manager Environmental and Energy Conservation 515 South Flower Street Los Angeles, CA 90051
VI-D-12	Morris L. Brehmer, Executive Manager Environmental Services Virginia Electric and Power Company Richmond, VA 23261
VI-D-13	J.G. Holmes, Director Environmental Planning TOSCO Corporation 10100 Santa Monica Blvd. Los Angeles, CA 90067